FAA AVIATION NEWS

OCTOBER 1971

FAA AVIATION NEWS

COVER
Away out West
where men are men
and women are pilots.
See page 8

FAA AVIATION NEWS

DEPARTMENT OF TRANSPORTATION / FEDERAL AVIATION ADMINISTRATION VOL. 10, NO. 6

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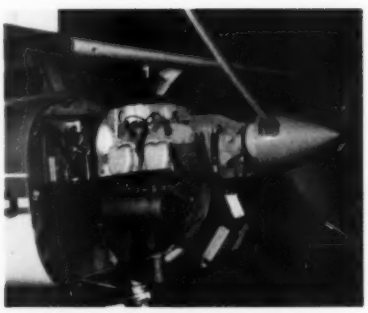

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John A. Volpe, *Secretary of Transportation*
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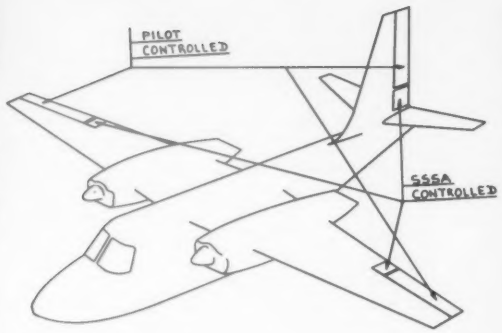


Left—wind tunnel data help evaluate design innovations. Above—one solution for instability may be "separate surface stability augmentation" (SSSA) with automatic and manual controls for both rudder and aileron.

Tomorrow's WINGS

NASA research at Kansas University seeking a more stable light plane design

In the brand new Space Technology Building at the Kansas University campus at Lawrence a general aviation simulator is being "flown" as part of a three-year research program supported by the National Aeronautics and Space Administration. One important objective of this study will be to design a new wing for light aircraft that will improve cruise performance, stability in turbulent air, and responsiveness at slow speeds.

The Kansas experiment is part of a program being carried on by NASA to apply aeronautical research methodology gleaned from research on extremely sophisticated equipment to the design of light aircraft.

The ability to study aircraft "in flight" by means of precise simulation of flight conditions is the key to the present research. Almost a decade ago NASA began an evaluation of the handling performance of typical general aviation aircraft to establish base-line data concerning their characteristics. In 1966 it was reported (among other findings) that the flight characteristics of these aircraft were degraded significantly by turbulent air, and that in some cases it was difficult or impossible to maintain a hands-off straight and level flight even in the most quiet air imaginable.

The immediate goal of the present research project at Kansas University is to construct a new wing from design studies provided by their recent work in the simulator. The experimental wing will be adapted to a donated Cessna *Cardinal*, which will be evaluated in wind-tunnel tests and later test-flown. The new design calls for higher wing loading (smaller wing area in proportion to aircraft weight), reduced wing thickness, and higher aspect ratio (in effect, longer wingspan).

The new high-lift wing will have a full-span leading edge Kruger flap and a 70 percent span single-slotted Fowler flap on the trailing edge. The Kruger flap, which lowers the stall speed, is operated manually to facilitate testing studies; the Fowler, which improves slow flight performance, is operated electro-mechanically.

In addition to conventional ailerons, the new wing will have a spoiler system that can be used for lateral control as well as direct flight path control during the landing approach and for ground braking.

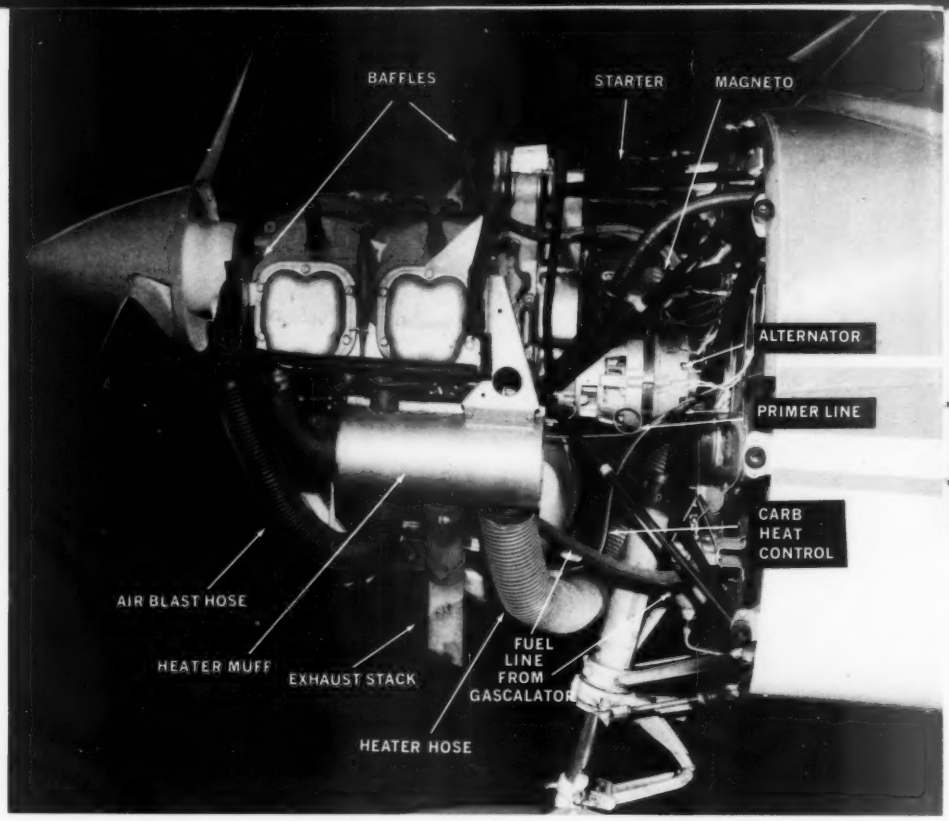
In yet another research program a small section of both the ailerons and the rudder will be linked to a stability augmentation system, which is expected to improve the handling characteristic of the aircraft in turbulent air. Linking only part of the control surfaces to the system reduces the degree of aerodynamic feedback, or autopilot resistance, to manual control of the airplane.

The simulator used in the studies leading to these new control designs was built by the Flight Research Laboratory at Kansas University. While flying the simulator the pilot looks out through a cockpit window at a closed-circuit TV picture that represents the outside world including terrain features, runways, etc. The television camera that generates this picture is "flown" over a realistic model of the terrain by an analog computer. This same computer provides the correct instrument readings and control forces to the pilot in the cockpit. Virtually any phase of flight can be realistically simulated, and the responses of the pilot and aircraft recorded.

The tremendous experience gained in simulator work by NASA on advanced commercial transports and future military aircraft is now being applied to problems of general aviation with the expectation that a modern data base and improved design techniques will make available light planes that are safer and more comfortable to fly. ■

Through the window of the simulator (developed by the University for this program) the pilot sees a realistic closed-circuit TV picture, photographed from model terrain with buildings, trees, a 1,000' grass STOL strip and an airport with two hard-surface 3,000' runways. Mirrors on the side give an illusion of infinite width. A computer drives the camera and provides control resistance.

Personal Inspection



The BEAST Up Front

(A series of articles on general aviation maintenance describing eight successive "personal" inspections for non-technically oriented pilot/owners, which spotlight attention on a particular sector of the airplane. Personal inspections are performed in addition to the normal overall preflight, and midway between annual inspections. Their purpose is to ward off potential heavy repair bills and possible accidents by means of a simple "see and touch" examination.)

The first Sunday. I began my series of successive inspections in early fall, reasoning that neither midsummer sun nor midwinter snow is conducive to touch testing the inner parts of my metal bird. And in the springtime—well, then everyone is eager to be off and flying. But my autumnal mood was mild and patient, as witness the generous 45 minutes I allotted for the inspection of the engine compartment.

Actually I found that just removing and later replacing the cowling took nearly an hour. The cowling of my Cessna 150 is made up of two sections, upper and lower, held in place by a type of turnlock fastener known as a Dzus Nut—which may be the name of the inventor. The Dzus is a kind of slotted rivet which locks against a spring when turned a quarter turn clockwise, and releases when turned exactly 90° counterclockwise. If you do not understand the nature of Dzus, you are apt to spend a good portion of a nice sunny day with a screwdriver in hand and a silly look on your face. Even if you are deep into Dzus, you may find that one pair of untrained hands is not enough to slip the cowling in place so that the fasteners are all lined up properly. The extra pair of hands may be those of a friendly mechanic or an obliging wife or husband—preferably one who is not easily offended by coarse expressions.

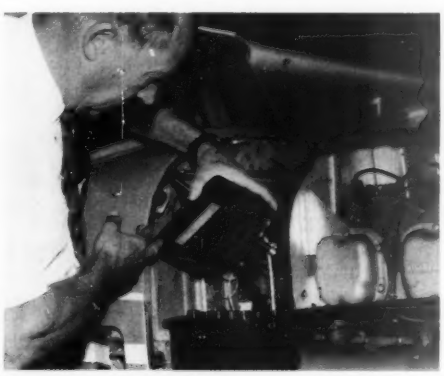
Dropping an Engine

When I had finally succeeded in laying bare the entire body of my 100 hp engine, I began my examination with the engine mounts. Losing an engine, in the popular sense of the phrase, may simply mean any kind of engine failure, but cases are on record of the engine actually breaking free of the airframe, with serious consequences. I resisted the temptation to pick up a wrench and cinch down bolts; instead I simply used my fingers and my eyes to check for any obvious signs of loose fittings or wear. I wiped the metal clean of oil streaks in order to inspect for cracks with my small magnifying glass, paying special attention to welds and attachment points. I used a hand mirror and a flashlight to see the underside of otherwise hidden surfaces.

Next I checked the alternator, starter motor and the magneto housings to see that they were securely fastened to the engine. I felt the wires attached to each part to make sure all were well grounded. I tried to do this, as I had been advised by my local GADO inspector, without pulling or tugging on the wires, but just running my fingers along them, looking for frayed insulation that could invite short circuiting.

Then I turned the fuel selector on while I checked the fuel lines and fittings for leakage. I followed the line of flow into the gascolator and thence to the carburetor and sniffed for telltale odors. And I checked the bent areas of copper tubes for kinking that might impede fuel flow.

The oil system was next. With a simple, wet sump arrangement like the 150's, about all I could do usefully was look and see whether oil was collecting anywhere on the engine, the firewall, or on the inside of the cowling. However, as an added precaution I had the engine oil drained through a cloth-packed funnel, and scrutinized the cloth for traces of metal or any other solid particles.



The airplane battery is often neglected because it is not readily accessible. It should be checked once a month for electrolyte level, and occasionally for charge. Above—battery cover should fit snugly. Battery vent tube (below) should be routed completely out of the engine compartment.

The vital linkage between pilot and engine must be seen as well as felt. A friend (or wife) can provide a very helpful second pair of hands for pushing and and pulling control knobs in the cockpit while the pilot/owner watches to see how controls respond.

A mirror, flashlight and a magnifying glass will help in the examination of the engine mounts (above) for cracks, failing welds, or insecurity of attachment. Below—the air intake screen in the nose is removed for cleaning and to check on the movement of the carburetor heat door.

The result was negative, indicating an absence of excess friction in the cylinders.

Item number five on my list was the exhaust system. Having been warned that high temperatures, strong gases and constant vibration subject exhaust parts to severe attrition, I was particularly sharp-eyed and somewhat less gentle in this inspection. I grasped the exhaust manifold where it connected with the engine ports with both hands to see whether it would move, and I also tested the exhaust stack for movement. I looked for cracks or weak fittings that might allow poisonous gases or dangerous flames to escape. Then I checked the flexible hoses leading to the carburetor heater and the cabin heater for security of fitting, and for possible chafing. Even in the absence of any mechanical wear these hoses are apt to deteriorate surprisingly, because of their nearness to the hot engine; and as they lose flexibility, their fittings may need adjustment—or the entire hose may need replacing.

At this point I again needed help, this time in the cockpit. My attention was now on the various control linkages described as "push-pull" levers—such as the primer, the fuel mixture, the throttle, carburetor heat, cabin heat, etc. My list also included cowl flaps, which my plane does not have.

I had each control activated several times while I checked to see that it performed its function fully and freely, without excessive play in the linkage. I removed the air intake screen under the nose so that I could watch the carburetor heat door open and shut, and while I had the screen off I decided to clean it—following the instructions in my owner's manual. (It was now noon, and my visions of having time for a Sunday cross-country flight had pretty well dissipated.)

Item number seven was the cooling system. Just because the engine is air-cooled, I had been informed, there is no reason to assume that this function will take care of itself. No one knows better than I (after having wrestled so long with the cowling removal and replacement), just how closely the cowling fits around that engine, which means that the movement of air over it, as directed by the engine baffles, is a very precise arrangement. If the baffles become bent or clogged with obstructions, however small, the air flow can be affected enough to raise the engine operating temperatures dangerously. The cowling itself has to be looked over to make sure none of the air inlets and exits are deformed or encrusted with dirt.

Cover That Battery

My last inspection item was the battery. When I removed the cover (designed to protect the engine from acid discharge), I found some interesting if rather disturbing accumulations around the terminals, so I borrowed some battery pliers, removed the battery from the airplane and cleaned the terminals carefully with soda and water. I coated both the terminals and the cable clamps with vasoline before replacing the battery. The electrolyte fluid level was low, so I added distilled water and fastened the cover on securely. Since it was not possible to check the charge until the engine had been operating for about half an hour, I hastened—or rather tried to hasten—to button the cowling back on so that I could at least salvage a short test hop out of what was beginning to look like a no-flying day.

When I checked the battery with a hydrometer later, the variance between cells was less than the allowable 20 points, so I made the final checkmark on my list. I was pleased to note that I had exhibited enough willpower to stick to the order of inspections on my list and had not been lured into skipping from one interesting mystery to another.

Alongside the eight items I had examined carefully I found only three notations I considered sufficiently important to be called to the attention of a mechanic: (1) a slightly loose magneto ground, (2) a "bright" area on the throttle linkage and possibly some unusual control resistance, and (3) a loose bolt that SOMEONE HAD LET SLIP INTO THE ENGINE BAFFLE.

Perhaps the most satisfaction I got out of that inspection was from being able to point an accusing finger, regarding the last finding, at my mechanic. Still, I have heard of "dead" props turning over because of poor magneto grounding, so perhaps by sacrificing a good flying morning I had saved someone's neck. Anyway, it seemed to me that during the flight I made that Sunday, however brief it was, my engine sang with a certain indefinable sweetness I had never noticed before. At least it knew I cared. ■

Wind Shear Revisited

(Editor's note: The article on "Wind Shear" in the May 1971 issue of FAA AVIATION NEWS provoked considerable interest and some confusion among readers who were unable to conceive how wind shear could affect the airspeed of an aircraft. The present article will deal specifically with this question.)

The inertia of the airplane is responsible for a momentary lag in airspeed during wind shear encounters. It can be critical.

The authoritative Private Pilot's Handbook of Aeronautical Knowledge (Advisory Circular 61-23) states that airspeed, which is defined as the rate at which an aircraft moves through the air, is not affected by the movement of air itself. This is perfectly true as long as we are talking about a *stabilized condition of flight*. Wind shear, however, involves an abrupt or sudden *change in wind velocity*. Since the inertia of an aircraft is far greater than that of the surrounding body of air, there will be an inevitable lag in responding to the sudden increase or decrease of wind, resulting in a temporary gain or reduction in airspeed or airflow over the wings, if the same power setting and aircraft attitude are maintained. The change in airspeed may not last more than a few short seconds, but it could be critical under some landing or takeoff conditions, if not properly responded to by the pilot.

To see how this is possible, let us review the basic concepts. Airspeed, as we all know, is of concern to the pilot as regards lift—in contrast to ground speed, which is of concern in matters of navigation. In the three illustrations taken from the Private Pilot's Handbook (*page 69*) we are shown that an aircraft in a no-wind condition (*top*) travels over the ground equally as fast as it travels through the air—120 mph in this case, with a given power setting and attitude. In the second illustration we see an aircraft flying with a 120 mph airspeed in a 20 mph tail wind and making good 140 mph over the ground. The third picture shows the same aircraft with the same airspeed flying through a 20 mph headwind and making only 100 mph over the ground.

Now consider what happens if the change from no-wind conditions to a 20-mph tail wind occurs with great suddenness (negative wind shear). Because the inertia of the airplane is much greater than the wind, it will not immediately receive a boost in ground speed of 20 mph. It will require several seconds, in fact, to achieve that gain, and during this lag period its *airspeed* will fall to some point between 100 and 120 mph.

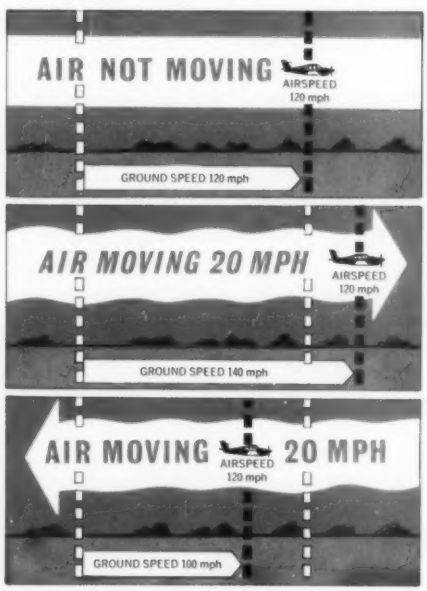
In cruising flight this would produce no serious problem, but if the aircraft is approaching to land at somewhat close to the stall speed, the approach path could steepen dangerously, or a stall could occur if the pilot did not respond immediately by applying power and adjusting elevator as necessary. Loss of airspeed always means a reduction in lift, which must be properly compensated for with both power and elevator if a constant approach path is to be maintained.

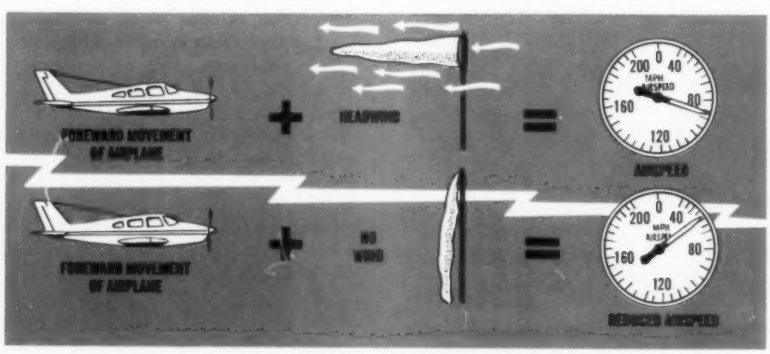
Consider now what would happen should a positive wind shear (headwind) of 20 mph take place. Here again the inertia of the airplane would delay the reduction in ground speed, while enabling the airspeed to increase temporarily—to somewhere between 120 and 140 mph. During this brief lag, there would be an increase in lift and a tendency to climb unless the pilot responded immediately by reducing power and lowering the nose.

If such a wind shear took place during a landing approach, the rate of descent would be reduced, and the landing could result in an overshoot, unless properly responded to by the pilot.

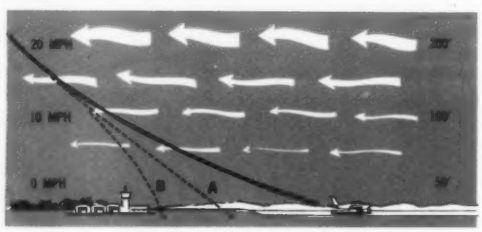
For any given type of airplane, the influence of wind shear on the landing operation is related to how quickly the airplane can be adjusted to the new operating conditions with reasonable safety margins. Naturally it is more noticeable with large airplanes having large inertia factors than with smaller general aviation types, but it is a phenomenon that should be understood by all pilots.

Wind shear during landing is a matter for concern because it introduces an unscheduled variable into a critical flight operation. While airspeed is little affected by stable movement of air it can be affected by *abrupt changes in air motion*. ■





In stable air wind has little affect on airspeed (left). With an abrupt wind shift (above) a sharp change in airspeed can occur briefly during the "inertia lag" while the plane adjusts to new wind conditions. Right—a sudden loss of headwind during landing could cause a pilot to land short (A) or even stall (B) unless he makes prompt throttle and elevator adjustments.



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FARs

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October 1, 1971

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Part 171	Non-Federal Navigation Facilities (7)	

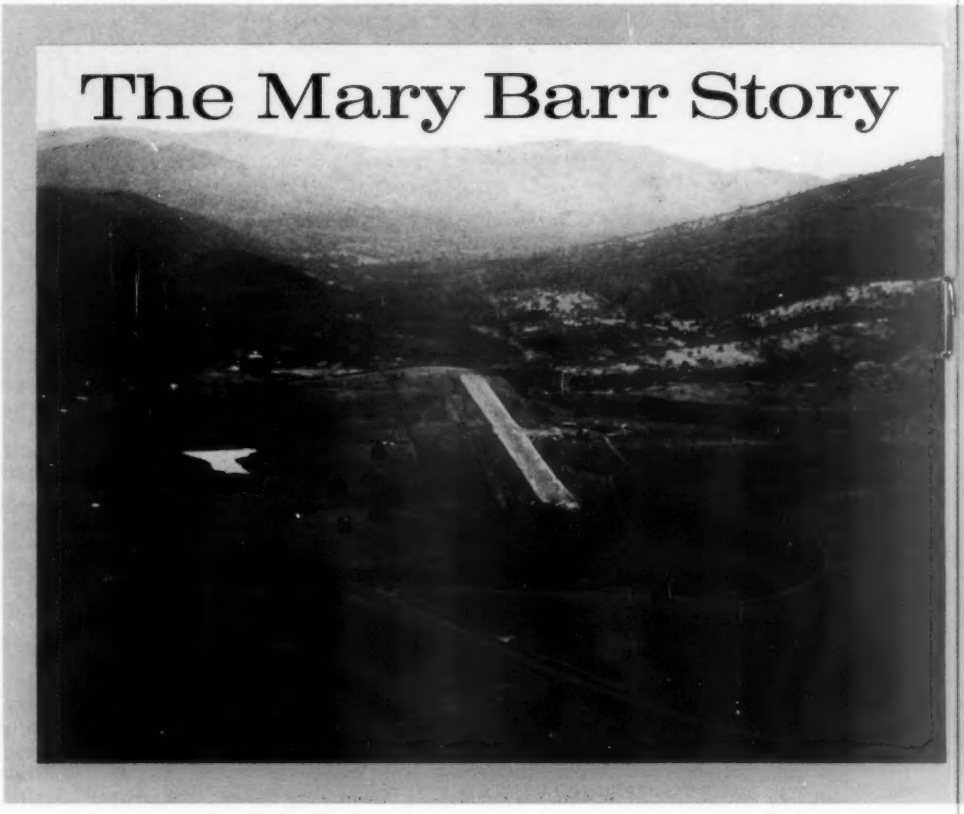
* Changes to individual airspace designations and airways descriptions, individual restricted areas and individual jet route descriptions are not included in the basic Parts 71, 73 and 75, respectively, because of their length and complexity. Such changes are published in the Federal Register and are included on appropriate aeronautical charts.

** Due to the complexity, length, and frequency of issuance, airworthiness directives, enroute IFR altitudes and standard instrument approach procedures are published in the Federal Register and are not included in basic Parts 39, 95 and 97. In addition, enroute IFR altitudes and instrument approach procedures are depicted on aeronautical charts.

Standard instrument approach procedures are published in the Federal Register by reference to FAA documents which are available for examination at the Rules Docket (GC-24) and the National Flight Data Center, in FAA Headquarters, Washington, D. C. and at FAA Regional offices and Flight Inspection District Offices.

Counselor at Large. Mary Barr, fixed base operator, is one of the new volunteer pilot counselors helping FAA Accident Prevention Specialists advise pilots locally on safe operating practices. Many counselors are women.

The Mary Barr Story



Civilian pilots appointed as accident prevention counselors have to be pretty good pilots. If you said that Mary Barr was one of the best women pilots in northern California, few people would quarrel with you. One certain dissident, however, would be Mary Barr herself, and it would not be a question of modesty.

Mary, who has had the fixed base at Susanville Municipal Airport, together with her husband Dave, for 22 years, has a painful reaction to the phrase "woman pilot." Like "woman driver," she feels it has a patronizing connotation that is in the main unmerited. Driving a car is something almost everyone does from necessity, she will point out, and obviously you have a lot of drivers who have little driving sense and even less appreciation of what makes an automobile run. But flying is another matter: it is costly, it is heavily regulated, and it requires too much professionalism to be taken lightly. If you qualify fully in every professional respect, why must you always be identified, with a smile, as a *lady pilot?*

Before *you* start smiling, better compare your qualification with hers. Mary has an ATR certificate, with a multi-engine rating. She also has towplane and glider pilot ratings and an approval by the Forest Service for patrol work. On the instruction side, she is a certified flight instructor (gold seal) and a ground school instructor, advanced and instrument. She is also a designated FAA pilot examiner, single and multi-engine. On the ground, she is a certified airframe and powerplant mechanic, a certified weather observer, and a first class welder. Are you sure there is anything you can do that she cannot do—better?

(Lest you imagine that she is less of a woman for being more of a pilot than most airmen, you had better know that she has kept house for Dave Barr for 25 years without complaint [they actually have two houses now, a ranchhouse as well as their home on the airport] and raised two daughters, now aged 19 and 22, naturally both pilots.)

Mary Barr never wanted to be anything but a professional pilot. Born in New Hampshire and brought up in Ohio, the daughter of a college professor and a grade school teacher, she inherited an obvious capacity for learning and teaching. But she early resolved upon a more active career, the broad outline of which was fixed from the moment she saw her first airplane. After two years of college (at Oberlin) Mary dropped her academic garb in favor of flying togs. She had her license at 19 and was instructing at 22.

Meanwhile, out West another case of airplane love-at-first-sight had already occurred when Dave Barr, a horse wrangler for the Forest Service in Idaho, caught sight of an airplane winging its way homeward in the summer sky. Right then and there he decided that horses were all right if you had nothing to get home for until the end of the summer, but he wanted something faster.

Dave Barr went directly from the saddle to the cockpit without even pausing to learn to drive a car. Soon he had a fixed base operation at Lewiston, Idaho; and he was doing well with charters and flight instruction when a young lass from Ohio, who said she was a pilot and would work cheap, hit him for a job. Dave was skeptical at first as to whether she would be more of a help than a hindrance, but he soon found her to be such an indispensable part of his operation that he quickly married her before anyone else could hire her away.

Dave and Mary Barr moved to Susanville in 1949 and have been there ever since. It is a small airport, with no scheduled service and no NAVAIDS other than the airport beacon and the UNICOM that is never turned off, day or night (they have a transceiver in their house as well as in the airport office).

Over the years the Barrs have become Mr. and Mrs. Aviation to their community, providing it with flight service of every known variety, for business, pleasure, instruction, medical emergencies, weddings, funerals, banner and glider towing, coyote hunting (no more of that now, they do not want to help kill off any more wild animals), sky diving, smoke jumping, forest patrol, surveying, prospecting, hauling freight, transporting prisoners—just about any legitimate means of earning money in airplanes that you can name.

On the ground their services include engine and airframe repair, ground school, weather reporting (the Reno weather office calls them seven times a day for an airways weather report, which includes sky conditions, temperature and dewpoint, barometric pressure and tendency). Mary and Dave Barr also do everything else around the airport that has to be done, from pumping gas, plowing snow and replacing light bulbs to lowering and raising the flag.

A day in the life of a small airport operator is apt to include such all-round responsibilities as running up the flag each morning, ferrying a patient to a hospital in another town, checking the weather instruments seven times daily for an airways weather report, and a spot of welding, besides countless other airport chores. But Mary Barr always has time to explain the fine points of flying over her mountain country to a pilot who asks for help.

Like most "Ma and Pa" operations, they have never been in danger of growing rich or lazy. Without benefit of an aircraft franchise to sustain them, they have earned their living primarily from flying and mending aircraft. In earlier years they divided the chores pretty evenly, but lately Dave has concentrated on running the business and on maintenance, while Mary does most of the flying. If Barr Aviation is to fly a highway accident victim to his hometown hospital, it is Dave who checks on the comfort (and credit) of the injured party while Mary prepares the flight plan and the airplane.

Paper work is the one real gripe of the Barrs, who say that they can ill afford the many non-revenue hours of work involved in preparing Federal, state and IRS forms. They acknowledge the need to regulate aviation in the name of safety, but they sometimes feel that an organization like theirs which has built up such an enviable record for safety and reliability could be exempted from some of the regulatory regimens.

For if Mary Barr is the first person to be sought after when a flying service is needed in the Honey Lake Valley, it is not simply a tribute to the Barr Aviation enterprise, nor is it a gentlemanly act of courtesy. It is a choice born of experience. People sense at once that if anyone can take the guesswork out of piloting, it is Mary.

Despite her early rejection of the academic life, she has always relied heavily on her native aptitude for learning. Inspectors who look over her logbooks are usually surprised to find that of her more than 9,700 hours scarcely 50 are dual. Her method of learning new techniques has always been to study the manual thoroughly and then go out and practice the procedure until she had it letter perfect. She has made it her business to know exactly what to expect of her airplane and never to press for more. People who engage her services know that she will never refuse any flying job, big or small, day or night, provided that it can be made with reasonable safety. They also know that no amount of money, coaxing, arguing or wailing will make her change her mind if she thinks an unnecessary risk is involved.

As an accident prevention counselor, Mary has been urged to speak out whenever she observes pilots about to take off under marginal conditions, or newcomers to the area planning ill-advised flights. But it goes against her nature to set herself up as an authority. "If anyone asks my opinion, I give it," she says. "If he doesn't understand something, I'll explain it to him. But I'm not about to walk up to some stranger and tell him how to fly his airplane."

In spite of this reluctance, FAA's Reno GADO (General Aviation District Office), which includes the area around Susanville, feels that Mary Barr is the kind of airman (or airwoman) who can really help the many new pilots coming into flying as a sport or a part-time business activity. Susanville has need of someone to whom pilots in doubt can turn with confidence. The mountains that surround the town (some of which top 10,000 feet and have patches of snow the year around) produce more than their share of tricky weather. If there is one "Voice of Experience" to whom the newcomers are drawn, it is likely to be Mary Barr.

This is not, she insists, because she takes a maternal interest in young pilots. More likely it is because she may be a little more articulate in explaining flight problems. As a schoolteacher's daughter she may have a little more patience with the ignorance and eagerness of youth than most of the veteran pilots in the valley.

In any event, FAA is glad to have Mary Barr formally designated as an accident prevention counselor—one of nearly a thousand such volunteers who back up the official accident prevention specialists at FAA's general aviation district offices.

Being a counselor gives Mary no official status, and adds not a penny to her till. Nor does it lessen her aversion to Government-imposed paper work. But it does give local airmen an excuse for seeking advice from the best professional pilot around. All they have to do is ask. L.D.G.

Famous
FLYERS

Louis Bleriot

First International Flyer

The poetic but seasick Frenchman who conquered the English Channel in 1909

"Ah, to be first. That is the supreme honor!"

Such was the motto of Louis Bleriot, the indomitable little French contemporary of the Wright brothers, who captured the supreme honor of his day by being the first to cross the English Channel in a heavier-than-air craft and, therefore, first to make an international flight.

And to Bleriot went the honor of being first to build a monoplane with a tractor engine, enclosed fuselage, rear-mounted empennage and landing gear consisting of two main wheels and a tail wheel—a basic configuration that is still considered "conventional" among propeller-driven craft.

He was also among the first to adopt the now universal system of cockpit controls: a foot-operated rudder bar, a central lever for pitch control and roll, and a hand throttle.

Bleriot's dogged faith in the superiority of the monoplane, eventually justified by history and the science of aerodynamics, was founded more on artistic vision than on principles of physics. He was more of a dreamer than an inventor, more of a poet than a daredevil, but he had a practical side to his nature which eventually led to financial success and worldwide recognition.

Hooked on Ornithopter

Born at Cambrai, France, in 1872, Louis Bleriot invented and manufactured the Bleriot acetylene automobile lamp, which brought early financial success to this devoted father of six and doting husband. His first sight of a flying machine was at the Paris Exhibition of 1900 where a bat-winged glider with a steam engine was displayed. This combination, built by Clement Ader, could not get off the ground and Bleriot thought he knew why. The wings did not flap, and Bleriot thought they should. Consequently, he built an ornithopter in 1902. On its initial flight the wings flapped themselves to pieces without ever getting the fuselage off the ground.

Bleriot next began to experiment with gliders. (He is credited with being the first inventor to document his experiments with his own motion pictures.) Although he failed in his early efforts to mate an engine with the glider, as did so many others, he never gave up. Experimenting with every known design and every new concept that emerged from his fertile mind, he produced an unbroken record of emphatic failures and a huge debris pile of smashed machinery. The moment each machine ended its life in a crumpled heap, the determined Frenchman would go back to his shop and construct another with a slightly different design approach. His fortune diminished at an alarming rate, but his spirits were undaunted.

In 1907, Bleriot built and tested three different monoplanes that actually flew for brief periods. The first, designated Bleriot V, had swept-back, paper-covered wings and a pusher propeller driven by a 24 hp *Antoinette* engine.

Next, he constructed a tandem tractor monoplane which featured elevons (combined aileron and elevator controls) and a sliding seat for longitudinal control. More powerful engines were installed in the next two models. The Bleriot VII, built in the fall of 1907, was the first to feature an enclosed cockpit, a two-wheeled main undercarriage plus a tail wheel, and a tail unit of elevons and rudder.

By the summer of 1909, after dozens of crashes and countless tearful remonstrations on the part of Madame Bleriot and family, Bleriot had arrived at a successful design adapting the wing warping technique. The new plane, the historic Bleriot XI, resembled a dragonfly in appearance. A tractor monoplane, it was equipped with a 25 hp *Anzani* engine which drove a wood *Chauviere* propeller. Total weight of the plane, one of the lightest ever built, was 484 lbs. Its framework was of oak and poplar, reinforced with piano wire bracing. Top speed was estimated at about 36 mph.

The Bleriot XI was aloft for more than 50 minutes on July 4, 1909. On July 13, Bleriot flew from Etampes to Orleans, a distance of 25 miles, and won a $2,500 prize posted by the Aero Club of France. He also managed to land without seriously damaging the airplane or the designer.

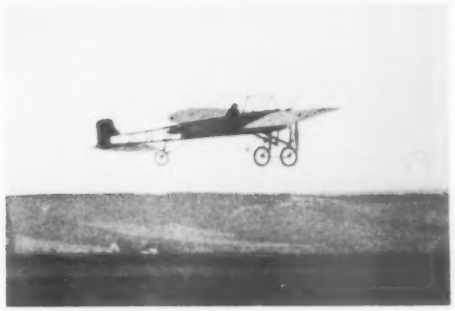
He was now ready for the supreme challenge—the aerial conquest of the English Channel. That summer the French coast near Calais had been heavily invaded by aspiring airmen with their entourage and the usual press representatives. If the honor of being first across the Channel was not in itself enough of a lure, there was the recently posted offer by the London *Daily Mail* of 1,000 pounds sterling (about $5,000) for the first flight in either direction.

The three chief competitors were Bleriot, Hubert Latham, a self-styled "man of the world" also flying a monoplane and Count Charles de Lambert, who had arrived on the coast with two Wright biplanes. While the tiny Bleriot XI was trundled toward Calais in a farmcart and while the Count's mechanics tinkered with the unfamiliar Wright *Flyers*, Latham made the first effort on July 19, 1909. An engine failure forced him down seven miles off the French coast, where a patrol boat rescued him, his ardor undampened and eager to try again. A new aircraft was rushed to Calais.

Six days later Bleriot bade farewell to his sobbing wife and six children and climbed into his aircraft. He was able to tear himself away only with the promise that win or lose it would be his last race. The distance was not great—a mere 21 miles—but the weather over the Channel was frequently bad and the seas rough. The very thought of ocean waves was enough to make Bleriot seasick, so he resolved not to look down unless it was absolutely necessary.

Given the virtual disappearance of his capital since he had become obsessed with flying, it was an all or nothing venture for Louis Bleriot. His business sense told him, with unerring foresight, that the winner of the Channel crossing prize would immediately dominate the European aircraft market. And to beat out the Wrights as well . . . !

Although the French destroyer *Escopette* was to monitor the flight in case he had to ditch, to further reassure "Mama," Bleriot equipped No. XI with an emergency flotation bag. On July 25, 1909, he took off from Les Baraques near Calais at dawn and headed for the cliffs of Dover, England. He described the flight later for the London *Daily Mail*:



Bleriot was credited with many firsts in the field of airplane design and construction, including the "conventional" three-wheel landing gear configuration. His historic hop of 21 miles across the Channel lasted 38 minutes. The flimsy 25 hp monoplane, Bleriot XI, weighed only 484 lbs.

Photo Courtesy of Hawker Siddeley

"Leblanc gives the signal and in an instant I am in the air, my engine making 1,200 revolutions . . . in order that I may get quickly over the telegraph wires along the edge of the cliff. As soon as I am over the cliff I reduce my speed. There is now no need to force my engine.

"I begin my flight steady and sure, toward the coast of England. I have no apprehensions, no sensations, pas du tout.

"The Escopette *has seen me. She is driving ahead at full speed. She makes perhaps 42 kilometers an hour. What matters? I am making at least 69 kilometers. Rapidly I overtake her, traveling at a height of 80 meters. The moment is supreme, yet I surprise myself by feeling no exultation. Below me is the sea, the surface disturbed by the wind, which is now freshening. The motion of the waves beneath me is not pleasant. I drive on.*

"Ten minutes have gone. I have passed the destroyer, and I turn my head to see whether I am proceeding in the right direction. I am amazed. There is nothing to be seen, neither destroyer, nor France, nor England. I am alone. I can see nothing . . .

"What can I do? It is evident that the wind has taken me out of my course. I am going in the direction of the Goodwin sands. Now it is time to attend to the steering. I press the lever with my foot and turn easily towards the west, reversing the direction in which I am travelling. I am in difficulties for the wind here by the cliffs is much stronger and my speed is reduced as I fight against it. Yet my beautiful aeroplane responds. Still steadily I fly westwards hoping to cross the harbor and reach the Shakespeare Cliff. Again the wind blows. I see an opening in the cliff.

"I attempt a landing, but the wind catches me and whirls me around two or three times. At once I stop my motor, and instantly my machine falls straight upon the land from a height of 20 meters. In two or three seconds I am safe upon the shore.

"Soldiers in khaki run up, and a policeman. Two of my compatriots are on the spot. They kiss my cheeks. The conclusion of my flight overwhelms me."

Bleriot's landing at Northfall Meadow near the Dover Castle was his usual shattering arrival. Although he walked (limping) away from it, the airplane was badly smashed and never flew again. However, he had completed the 21-mile flight in 38 minutes and achieved the "supreme honor" he had sought.

Bleriot's fame as an aeronaut spread rapidly after this epochal flight. So also did his reputation as a designer and builder of planes. Within two days, he received orders for more than 100 Model XI's and immediately set about trying to fill them. He made two more XI's for himself and then reverted to planes with ailerons for the Model XII. Powered by a 35 hp engine and built to carry a passenger, it flew with another person aboard for ten flights. Then, fitted with a 60 hp engine, it became the first plane in the world to fly with two passengers.

Although Bleriot made a Model XIII, the XI remained the most popular of his pre-WW I designs. In the hands of pilots of several nations, the Bleriot design achieved many firsts, including first to cross the Alps. His planes also won many air races, including the 1910 Gordon Bennett Cup Race.

In November 1909 Bleriot opened up a flying school. One of his students, Adalphe Pegoud, became a Bleriot test pilot and in 1913 made the first arrested landing by hooking his plane on a wire stretched between two pylons. (Although disputed by some historians, these tests were filmed to provide proof of his claim.)

In Bleriot designs, Pegoud was first to achieve inverted flight, rolls, an inside loop and a vertical S. During all of these maneuvers, Pegoud wore a shoulder harness—another aviation "first" for Bleriot planes.

Bleriot's success with the monoplane established this design as a classic. However, others who tried to copy his single-wing design ran into difficulty and there were many monoplane accidents, some fatal. In a number of accidents, the wing became detached in flight because of inadequate stressing. It was not long before all monoplanes were considered "death traps." At the beginning of World War I, those who favored biplanes convinced the British government that the single wing was inherently dangerous. As a result, flying in monoplanes was forbidden by the Royal Flying Corps.

Monoplanes Grounded

As the recognized expert on monoplane design, Bleriot was asked by the French government to determine the cause of the wing failures in non-Bleriot designs. He quickly ascertained that the problem lay in the wire bracing that kept the wing from flapping off in up and down drafts. Most manufacturers were attaching the wings at too shallow an angle from the fuselage, he reported, and he recommended that all wire bracing be at greater angles by attaching them to a pylon. The French army grounded all monoplanes until they could be safely modified.

Unfortunately for Bleriot, his wing bracing theory was not universally accepted, and WW I was fought mostly in bi- and triplanes. Monoplanes all but disappeared from the skies in the 1914-1918 time period. Seeing the trend, Bleriot bought the Deperdussin plane factory which turned out the famous Spad (biplane).

Bleriot continued in aviation after WW I, specializing in small single-engine aircraft and large four-engine flying boats. However, like so many of the early pioneers, he never again achieved the fame occasioned by the first Channel flight. He died in Paris in August 1936. His famous Bleriot XI may be seen today in the Conservatoire des Arts et Metiers in Paris. ■

Helicopters at the Fort Rucker, Ala. training center were equipped with PWIs in an effort to cut down on mid-air collisions, which had become a problem in the heavy traffic.

CAS and Mini CAS

Editor's Note: The first article in this series appeared in the September issue of FAA AVIATION NEWS and described FAA's 15-year search for an electronic surveillance system that would help prevent midair collisions. Early investigations by FAA, later coordinated with industry research, led to development of a "cooperative" time/frequency collision avoidance system (CAS) now being installed for evaluation in air carriers. More recent developments of non-synchronous systems are discussed today.

FAA's primary mission is the safe and efficient movement of air traffic, and as such the entire air traffic control system may be thought of as a CAS. The philosophy behind the CAS/PWI (pilot warning indicator) programs has been to search for a collision avoidance system which could serve as a backup to air traffic control and provide protection in areas not served by FAA—and which would produce minimal interference with the flow of air traffic and the work load of controllers.

The only CAS equipment which has actually been built to date is the time/frequency or so-called "ATA" CAS, which consists of a transmitter and receiver, an altitude a timing device, a time propagator and a decoder and transmitter, a doppler analyzer, and a Tau computer. (Tau determines time to closure by dividing range by range rate.) When the computer determines that a possible collision threat exists, it warns the pilot through both visible and audible signals and also directs him toward the appropriate evasive maneuver.

The full time/frequency CAS is intended for air carriers and high flying jets. A lesser version not capable of air-to-air time synchronization will be available for high performance general aviation aircraft. For aircraft that normally fly below 10,00 feet and under 250 knots, there are lesser time/frequency subsystems expected to be priced within the range of most light plane owners, including several types of PWI's capable of simply warning the pilot that other aircraft are nearby.

FAA is also looking at the non-synchronous (not depending on synchronized clocks) systems developed independently by RCA, and by Honeywell, Inc. Honeywell uses a radio frequency interrogator/transponder which interrogates continuously (about 50 times per second), deriving position and altitude data in much the same manner as is done with beacon radar. This is also a "cooperating" system, requiring a compatible device in each participating aircraft.

In contrast to the time/frequency CAS, which allows only one aircraft to transmit at a time, Honeywell's concept is to make use of extremely short transmissions which take place within *a few billionths of a second.* This assures, according to Honeywell, that even if several hundred aircraft are transmitting within radio range of each other the likelihood of simultaneous reception is small —and would be inconsequential even if it did occur occasionally, since threat evaluation is based on a continuing flow of pertinent data.

Honeywell's concept was developed originally as a pilot warning indicator in response to a request from the Army for a means of preventing midair collisions at Fort Rucker, Ala., where intensive training in helicopters takes place within a limited airspace. The PWI produced for this special environment, which weighed six pounds installed in the aircraft, provided the pilot with audible and visual warning signals whenever one or more similarly equipped aircraft came within a selectable range (1,000, 2,000 or 3,000 feet) and within an altitude band of ± 300 feet. The panel display simply indicated whether the intruder was above, below or level with the protected aircraft.

Since the delivery of 285 Honeywell PWI's to Fort Rucker in August 1970 the equipment has functioned continuously and satisfactorily, according to Honeywell.

The company is expanding their basic concept to develop a full-fledged CAS incorporating the Tau principle. Towards this goal, equipment is now being flight tested by the Army which would identify collision threats at an extended range (more than two miles) and indicate altitude as well as bearing within one of four 90° quadrants. The appropriate evasive maneuver could be displayed as a command to the pilot.

In a sense, the Honeywell company started with a general aviation type of PWI (which has been thoroughly evaluated in a

Suggested cockpit displays might simply involve additions to the climb/descend indicator instrument display. An arrow (left) would light up in the climb or dive position when such evasive action was required. Or (right) the pilot would be cautioned against increasing his altitude by an illuminated arc. Audio signals would draw his attention to the panel.

special military environment) and has been expanding the concept into a "building block" family that may be suitable for all types of aircraft.

RCA's version of a non-synchronous CAS is called SECANT, for Separation and Control of Aircraft by Non-synchronous Techniques. Like Honeywell's system, it is not dependent on any ground signals and relies on airborne interrogators and transponders to determine range, range rate, altitude and bearing data. In SECANT both the interrogating pulse train's makeup and the time of transmission are randomized (by a sort of electronic coin tosser) so that all participants can interrogate at any time without, according o RCA, either overloading the system or causing interference. It too is a cooperating system effective only for participating aircraft.

SECANT will offer a PWI, a "Vicinity Traffic Finder," a CAS and a super CAS known as TMS for Traffic Monitoring System. The latter will offer the pilot a situation display of all ambient traffic which may interact with his aircraft within about 60 seconds, with range, bearing and altitude indicated. This would assist him in not making an unwise hurried change of course, thus precipitating other conflict situations.

Another feature of SECANT which could also be incorporated in similar systems is the so-called "hot line" which would allow any threatening situation to be conveyed automatically to the console of a ground controller, with a minimum of disturbance to the flow of other air traffic. Use of digital communications for this purpose would avoid tying up much needed voice channels.

The basic difference between SECANT and the Honeywell systems is the manner in which transponder-derived information would be processed, evaluated and presented. SECANT's PWI's will not have a digitizing altimeter, owing to their high cost, but will enable bearing information to be obtained by other SECANT equipped aircraft. All RCA models will be solid state, with peak power never more than eight watts.

Prices for the most sophisticated CAS in every system will range from $20,000 to $50,000. Lesser equipment intended for general aviation will range down to the price level of the standard ATC transponder.

FAA is looking at these and other airborne collision avoidance systems, not only for their ability to prevent midair collisions but also for their compatibility with the air traffic control system, which is and will remain the basis of all air traffic separation. The drawback of cooperative systems such as those discussed above is the threat posed by non-participating aircraft—and hence the problem of agreeing upon an essentially homogeneous, economically appealing CAS.

A third and final article in this series will discuss some promising approaches to a ground based CAS, including the Goodyear STARAN "associate array processor," and the Discrete Advanced Beacon System. ■

Pilot BRIEFS

■ LEVELING OUT AT 18,000. The floor of positive control airspace will be a uniform 18,000 feet over the entire adjacent United States as of October 14, 1971. Aircraft in positive control airspace must be flown by an instrument-rated pilot in accordance with a specific air traffic control clearance. The aircraft must have all required navigation equipment for IFR operations, as well as two-way radio and a radar beacon transponder. FAA has been in process of lowering the floor of positive control airspace, area by area, from 24,000 feet to 18,000 feet since 1967.

■ GETTING THE WORD. Government publications (such as Federal Aviation Regulations and Advisory Circulars) purchased through the Superintendent of Documents in Washington, D. C., may now also be ordered (or purchased over the counter) at four new Government Printing Office bookstores in Colorado, Georgia, New York, and Texas. Ordering nearer to home may mean a saving of two or three weeks in delivery. Address GPO Bookstore, at any of the following:

Room 1421, Federal Building
1961 Stout St.
Denver, Colo. 80202

Room 100, Federal Building
275 Peachtree St., N.E.
Atlanta, Ga. 30303

Room 110
26 Federal Plaza
New York, N. Y. 10007

Room 1C46, Federal Building
1100 Commerce St.
Dallas, Tex. 75202

■ EXHIBIT SPACE at FAA's Seventh Annual International Aviation Maintenance Symposium may be reserved by contacting the FAA Aeronautical Center, P. O. Box 25082, Oklahoma City, Okla. 73125 (telephone: 405-686-4351). The Symposium will be held at the Skirvin Hotel in Oklahoma City December 7-9, 1971; space will be available for both static and operable exhibits. Deadline for exhibit reservations is November 25.

■ DOWN MEXICO WAY. Albuquerque Airport was designated on October 1, 1971 an official "Landing Rights Airport" (international flights may land if advance application is submitted to U.S. Customs). Flight clearances for departure to Mexico will be issued by the Albuquerque flight service station.

■ QUOTA HOURS REDUCED AT O'HARE, JFK. Starting October 25, 1971, flight quotas affecting the number of IFR arrivals and departures permitted at Chicago O'Hare and John F. Kennedy Airport in New York will apply only during peak hours, from 3 to 7:59 p.m. The quota regulation has been in effect from 6 a.m. to 12 midnight and will continue to apply during these hours at two other designated high density airports: Washington National and New York LaGuardia.

SLOW FLOW **Three members of the five-man National Transportation Safety Board tour FAA's National Aviation Facilities Experimental Center, Atlantic City, N. J., for a first-hand look at aviation safety research projects, many of them the outgrowth of NTSB recommendations. Among the projects: flammability of aircraft interiors, wake vortices, light aircraft seat restraints. Left to right, NTSB members Oscar M. Laurel, Adm. Louis M. Thayer and Chairman John H. Reed watch FAA Deputy Administrator Kenneth M. Smith display gelled fuel.**

Emergency Locator Transmitter Regulations Published

FAA has adopted regulations in response to the Federal Law (Public Law 91-596) which makes emergency locator transmitters (ELT's) mandatory on most general aviation airplanes after December 30, 1973.

The ELT is a compact, lightweight, self-contained transmitter designed to be carried in an aircraft. Its purpose is to broadcast a distress signal to aid searchers in finding a plane after a crash or forced landing. ELT's will be mandatory on virtually all new general aviation aircraft delivered in the U.S. after December 30, 1971, and on most other planes after December 30, 1973. (Specifically named exceptions are air carriers, jets, military aircraft, aerial applicators, helicopters and planes used solely for training within 20 miles of their home airports.)

The new FAA rule will require the ELT to be mounted (either permanently or temporarily) on the airframe, and to be capable of being activated both manually (by hand switch) and automatically (on impact of 5 G's). Minimum power is 75 milliwatts (enough to broadcast more than 50 miles for at least 48 hours under nearly all circumstances). Batteries must be replaced or recharged when half of their useful life expectancy has expired, or when they have been actually used for one hour.

Technical standards for the units (concerned primarily with tolerance to shock, vibration, temperature extremes and other adverse environmental conditions) are contained in three RTCA (Radio Technical Commission for Aeronautics) documents, prepared in cooperation with FAA and the industry. These documents cover the three ELT categories: RTCA DO-145 for the least expensive "personnel" type (normally switched on manually); DO-146 for the survival (over water) type, designed to be attached to a life raft; and DO-147 for the three automatic types—fixed, movable, and deployable—which would normally be activated on impact. (Actually all units except the survival type must be capable of being activated automatically as well as manually.)

These documents may be purchased at $8.00 each from RTCA, Suite 655, 1717 H Street, N.W. Washington, D.C. 20006, or they may be examined at FAA regional or district offices.

(Articles in the May and August 1971 issues of FAA AVIATION NEWS discuss this subject in detail.)

New FAA Airport Classifications

FAA has issued an advisory circular explaining the new national airport classification system. The new classifications are expected to aid airport planners in translating aeronautical demand into airport development requirements.

In the future airports will be classed by present and projected levels of public service (enplaning of passengers) as Primary, Secondary or Feeder airports, with each category divided into groups of high, medium or low aeronautical density (aircraft operations). Airports were previously classed simply as air carrier or general aviation.

Copies of the Advisory Circular AC 150/5090-2 may be obtained free from the DOT/FAA Distribution Unit, TAD-484.3, Washington, D.C. 20591.

Pilot Population Growing at Slower Rate; Fewer Students

The pilot population in the United States reached a peak of 732,729 in 1970, according to the recently published report, "1970 U.S. Civil Airmen Statistics." This represents a 2 percent annual increase, compared with a 4 percent increase in 1969 and a 12 percent increase in 1968.

All categories of pilots registered gains except student pilots, whose number dropped from 203,520 in 1969 to 196,861 at the close of 1970.

Private pilots now represent 41 percent of the total pilot population, followed by students (27 percent), commercial pilots (25 percent), airline (5½ percent), and miscellaneous. The sharpest recent increase by category was in "helicopter only" ratings, which rose from 4,286 to 6,677. The number of "glider pilots only" certificates jumped up from 2,627 to 3,114.

The statistical report is available free upon sending a self-addressed mailing label to the DOT/FAA Distribution Unit, TAD-484.3, Washington, D.C. 20591.

Applications for Airport Funds

General aviation airports are again scheduled to receive $30 million in Airport Development Aid Program (ADAP) funds during the Fiscal Year 1972, which ends June 30, 1972. Requests for funds are being accepted for the current year, and applications submitted last year but not approved will automatically be considered. Sponsors should provide any new information which is pertinent.

Omega Navigation Meeting Planned

A three-day symposium on the Omega, a new overwater navigation system, is scheduled for November 9-11 at the Sonesta Hotel in Washington, D.C., under the sponsorship of FAA, the National Oceanic and Atmospheric Administration, the U.S. Navy, and the Institute of Navigation.

The Omega navigation system is a very low frequency (10 to 14 KHz) position-fixing system being developed for use by ships, submarines and aircraft. Eight strategically located ground stations will provide worldwide coverage with the user's positions computed on the basis of the phase difference in signal reception from several stations.

More than 35 technical papers will be presented by U.S. and foreign governments, and private industry. The papers will cover Omega experiments to date, those presently underway and future plans.

Interested persons may write the Institute of Navigation, Suite 832, 815 15th St. N.W., Washington, D.C., or call (202) 783-4141 for information.

FAA Aviation News welcomes comments from the aviation community. We will reserve this page for an exchange of views. No anonymous letters will be used, but names will be withheld on request.

• Queen Under Pressure

Your article "Queen for a Day" in the May 1971 issue of FAA AVIATION NEWS seems to indicate that pressurized cabins in passenger planes were unheard of at the time of the inception of the DeHavilland *Comets*, which was near the end of the Second World War, but am I not correct in thinking that the Boeing 307 *Stratoliner*, which was built in 1940, was the world's first pressurized passenger aircraft? Incidentally, two of these aircraft are currently in regular service in Indo-China, registered to the International Control Commission.

D. Dearlove
Southend-on-Sea, England

It is certainly true that designers had been experimenting with pressurized cabins since the early 1930's. The Farman brothers in France were pioneers in this field and, of course, Boeing with the 307 Stratoliner, *but none of their flights were over 30,000 feet. To our knowledge no one had attempted to fly with a pressurized cabin in a civilian aircraft as high as 39,000 feet at the time the* Comet *was conceived.*

• Abreast of the Rules

Since FAA has a complete list of names and addresses of all pilots, would it not be possible for FAA to notify all pilots of significant changes in rules and regulations as they come about? This would eliminate the problem of uninformed pilots and would be a step closer to safer skies.

Carl L. Dworman
Wickford, R.I.

The large number of persons holding pilot certificates (over 740,000) combined with the frequent changes to the many Parts of the voluminous (11 volumes) Federal Aviation Regulations, make it impractical to notify individual pilots of these changes by mail.

Changes are normally announced through news releases (which are published by newspapers and aviation magazines), Notices to Airmen (NOTAMS) where applicable, posted on FSS bulletin boards, and printed in the Federal Register. The official agency magazine, FAA AVIATION NEWS, presents news items or feature stories concerning all rule changes or Notices of Proposed Rule Making which are of importance to the general aviation pilot and aircraft owner.

• Airport Patterns

I read your publication with great interest and would like to comment on new pattern procedures as discussed in the June 1971 issue. I believe it would be of value in pattern procedures to separate high wing and low wing aircraft. I suggest this be done in two ways—vertically and laterally, with the low wing aircraft using the current 800′ AGL and flying inside a series of pattern markers, and the high wing craft flying at 1,000′ AGL outside the pattern markers. Adopting the above pattern scheme would put each plane in the most favorable position to be seen by the other all the way to final approach.

For pattern markers I suggest a single pole with a large target mounted atop, which can be illuminated for night-time approaches.

Marion J. McNair
Pasadena, Calif.

A Notice of Proposed Rule Making on airport traffic patterns was issued 14 July 1971. Your recommendations for marking and flying an airport traffic pattern are much appreciated, and will be made a part of the public docket of comments in response to the Notice. They will be used, together with other recommendations, in developing a final rule.

• All That Flashes Is Not Strobe

I am puzzled by the mention of "two bright white lights" flashing on the departing jets in your story "Legal But Unsafe" in FAA AVIATION NEWS, April 1971. Your story went on to say, "but they must have been seen on radar —the flashing lights on the departing jets indicated they were on the lookout for trouble."

I assume your author was trying for the most mileage from the description of white strobe lights on the jet. Please leave such misinformation for the aviation pulp magazines.

Russell B. Prisson
Meridian, Miss.

No, the lights referred to in the article (taken from an actual incident) were landing lights being flipped on and off by the air carrier pilots. When safety is at stake, it is normal procedure to use any available means of attracting attention. In this case the pilots, departing through a cloud, had been alerted by a radar controller to a target ahead, with intentions and identification unknown.

• As Time Goes By

Bob Serling's nostalgic backward glance at Pan Am's first scheduled transatlantic jet flight (AVIATION NEWS, June 1971) was a felicitous sample of the way aviation has foreshortened the perspective of history. It seems like only yesterday when Pan Am with its 707 and BOAC with its Comet IV were in a full-blown competition to get that very first jet across the Atlantic. As Serling pointed out, BOAC won that particular round. According to my computer, however, Pan Am's inaugural was hardly "four decades after Lindbergh's historical flight over the same route" which would have fixed either the former only three years ago or the latter during World War I.

John Dohm
Studio City, Calif.

Time did go by a little too fast for the inspired author. Three decades would be closer to the mark.

• How Many Watchful Eyes?

I was interested in your article "The Watchful Eye" on the new standard control tower design (July 1971). You mention that FAA provides control towers wherever the traffic exceeds 100,000 landings or takeoffs per year. It was my understanding that the criteria was 24,000 annual operations. Has this figure been changed?

You also state that the new tower will be built at 33 "projected major airports" in the next decade. Can you list these 33 airports?

J. E. Johnson
Chicago, Ill.

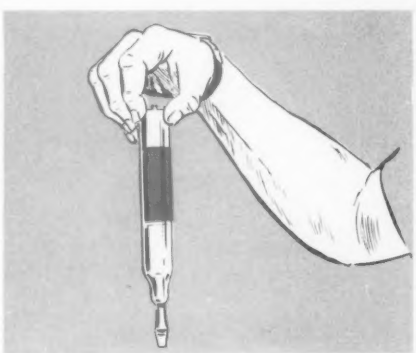
You are right; a publicly-owned airport having scheduled air carrier service with 24,000 or more annual itinerant operations, or 50,000 or more annual itinerant operations of any kind is a candidate for an FAA control tower. The above criteria are contingent upon three consecutive FAA counts. However, there are studies underway which are directed toward eventual change in control tower and other facility criteria. The basic thinking underlying the proposed changes in criteria is that the number of persons served as well as aircraft operations should be considered.

The reference to 33 new towers is an approximate projection of how many of the new type towers will be in operation within the next ten years and does not refer to any specific airports. Locations will be decided by needs and budget limitations during individual fiscal years.

• Alcohol and Water

I am having problems with water in the fuel system of the seaplane I am flying. After all precautions are taken to clear the system of water, I have again found water after an hour or two of flying. I would like to know if an additive such as alcohol can be used in the fuel? Is there an FAR that would prevent this?

Dana Middlekauff Bernard
Bunnell, Fla.



We know of no additive that can be used for the purpose you suggest. We would caution you against the use of alcohol or similar products in airplane fuel tanks, even though it may not be specifically prohibited by the rules. Excess water is apparently entering the fuel system in your seaplane from some outside source. We suggest you investigate fuel filler openings, forward-facing vents, if any, and even your fuel servicing equipment, and that you seek further assistance from the airplane manufacturer and your nearest FAA GADO.

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When Nature Rages

Stick to Your Gauges

Suggested by Charles J. Dowiot
Ontario FSS, Calif.